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Three Researchers Report on Air Pollution

At the request of health officers in the San Francisco Bay area for current information on research being done to study the cause, effects and methods of control of air pollution, the State Department of Public Health arranged for directors of three research projects in California to report on recent research developments. This they did at a Berkeley meeting December 10. (*California's Health*, January 31, 1954.) A brief summary of their remarks is presented here.

Mr. Paul Magill, Technical Director, Air Research Laboratories, Stanford Research Institute, reported on (1) factors involved in temperature inversion, and (2) the identity and major sources of air pollutants in the Los Angeles area.

Dr. A. J. Haagen-Smit, Professor of Bio-Organic Chemistry, California Institute of Technology, Pasadena, nationally known for his work on smog, reported on (1) hydrocarbons and their oxidation products, and (2) measurement of smog in the atmosphere.

Dr. Paul Kotin, Assistant Professor of Pathology, University of Southern California School of Medicine, and director of USC's air pollution research, described briefly some problems involved in setting up the research project to measure the physiological effects of smog on animals and humans. His major comments, however, were based on findings of his previous research work regarding the relationship between air pollution and cancer and, for this summary, Dr. Kotin has submitted an excerpt from a paper, "The Current Status of Air Pollution Studies in the Etiology of Lung Cancer," which he presented before a meeting of the American Cancer Society in New York.

I. SOME IMPORTANT ASPECTS OF AIR POLLUTION

MR. PAUL MAGILL, Technical Director Air Research Laboratories, Stanford Research Institute

Factors Involved in Temperature Inversion

On the West Coast we hear quite a bit about temperature inversions in the lower levels of the air. Their existence is one of the principal contributing causes to air pollution on the West Coast. Knowledge of why they occur is important to understanding why nothing has been done to remove them.

Visualize, if you will, a large column of swirling air between the Pacific Coast and the Hawaiian Islands. Looking down upon it, this swirl of air rotates clockwise, with the eastern edge of the swirl enveloping the entire Pacific Coast and the western edge somewhere between the coast and Hawaii. This air swirl is tilted at an angle and the air that reaches the Pacific Coast has become heated by compression through the same mechanism that causes a bicycle pump to get hot when you use it.

Also important is a rather steady wind that blows from the north toward the south along the coast. Contrary to what many people suspect, the water does not move with the wind but at an angle to it and away from the coast, i.e., toward the west. As a consequence, the surface water flowing out from the coast is replaced by frigid water from deep down in the ocean. Because of the peculiar shelving of the land, this is especially noticeable in the San Francisco area and makes ocean bathing there uncomfortable.

This set of large-scale meteorological forces is important to air pollution because it means that air flowing inland at San Francisco and at Los Angeles

has passed over thousands of miles of chill ocean water and has become cooled in the process. When the ocean breezes blow into either Los Angeles or San Francisco, we have cool air coming in under the layer of warm air created by the large Pacific air swirl. These two air masses do not mix and any waste that we put into the air when these air masses lie over the land cannot be carried away vertically.

In Los Angeles there is the unfortunate circumstance that the winds moving horizontally are not strong, so that the air pollution generated there hangs around. In the San Francisco area, the situation is much better because there are the large air outlets through the mountains into the Santa Clara, San Joaquin, and Sacramento Valleys. On the average, the horizontal winds are stronger in the San Francisco area, and there is much better ventilation. Sometimes even in the Bay area the winds fail us.

The rest of the story is that we are now putting much more into the atmosphere than we have in the past and are accumulating more material in the atmosphere than we care to tolerate.

Identity and Major Sources of Air Pollutants in the Los Angeles Area

In Los Angeles the polluting materials do not come from any single source, but from a multitude of sources. They are not restricted to industrial emissions, nor to acts of the public. They come from both. Just what these materials are may not be important to discuss in detail at this time. We have analyzed the atmosphere and can name at least 50 different impurities. The major types are indicated in Table I.

We know from our own experience that we can introduce as little as one pound of material into the atmosphere and later pick some of it out of the air 20 miles away. So, whenever you see a smoky stack or something giving off dust or fumes, you can be pretty sure that this is contributing to air pollution over a considerable area.

The burning of all materials, including fuels and rubbish, are activities that contribute in an important way to air pollution in Los Angeles, as well as in other cities where air pollution has become a problem.

Without going into detail and naming all of the materials that have been found in the atmosphere,

TABLE I

ESTIMATES OF TONS OF POLLUTANTS EMITTED DAILY TO THE LOS ANGELES ATMOSPHERE BY COMBUSTION PROCESSES (1950)

Material burned	*Aldehydes (as formaldehydes)*	*Ammonia*	*Nitrogen oxides (as nitrogen dioxide)*	*Sulfur oxides (as sulfur dioxide)*	*Acids (as acetic acid)*	*Organics*	*Solids*
General Public Emissions							
Fuel gas	6.5	-	47	--	9	10	-
Fuel oil	2.5	-	27	60	27	10	0.5
Gasoline	30	4	140	30	3	850	0.5
Refuse	3	4	1	2	2	550	-
	42	8	215	92	41	1,420	1
Petroleum Industry Emissions							
Fuel gas	9	4	61	84	11	13	0.5
	2.5	-	30	66	30	10	0.5
	11.5	4	91	150	41	23	1
Catalytic cracking	0.5	0.5	0.2	13	--	--	5
Other Industry Emissions							
Fuel gas	4.5	-	32	--	6	7	-
Fuel oil	4	-	43	94	43	15	1
Refuse (wood)	5	0.2	3	0.5	1	50	-
	13.5	0.2	78	94.5	50	72	1
Totals	67.5	13	384	349.5	132	1,515	8

Table I lists (by broad sources) some of the materials that have been studied intensively in Los Angeles. This table shows that there are significant contributions to air pollution from the public and from industry.

The data in Table I are the results of a survey made in 1950. They do not represent any particular day, and were only an estimate applicable to Los Angeles at the time that they were made. Since the Los Angeles area has had a steady population growth of about 3 to 4 percent a year, the data in the table should be increased about 10 percent, assuming that other important changes have not occurred.

One of the more significant discoveries that has come out of the work in Los Angeles is that some hydrocarbons which have hitherto been considered to be relatively innocuous can react in the atmosphere and form new products that cause adverse effects. The sources of these hydrocarbons are from processing and handling operations and, to a very large extent,

from the unburned fuel that passes out in automobile exhausts. A 1950 estimate of the origin of some of these materials for the Los Angeles area is shown in Table II.

From this table it can again be seen that the automobile is one of the principal contributors to air pollution.

TABLE II
COMPILED DAILY EMISSION OF HYDROCARBONS
Estimated (1950)

Hydrocarbons from	*Tons*	*Percent of total*
Auto exhaust	850	53.3
Petroleum productions	270	16.9
Petroleum marketing losses	90	5.7
Petroleum refinery losses	350	21.9
Miscellaneous	35	2.2

II. THE NATURE OF AIR POLLUTION IN LOS ANGELES

DR. A. J. HAAGEN-SMIT, Professor of Bio-Organic Chemistry, California Institute of Technology

The air pollution problem in Los Angeles is often compared to that of Pittsburgh, Detroit, St. Louis and other cities. Disasters are cited which took place in Donora, Pennsylvania, the Meuse Valley in Belgium, and in Poza Rica, Mexico. These air pollution problems have very little in common with our smog.

Hydrocarbons and Their Oxidation Products

Chemically speaking, we are faced with an action opposed to that of the reducing sulfur compounds. The most typical aspect of the Los Angeles smog is its oxidizing power. Air bubbled through potassium iodide liberates iodine. Phenols, thio compounds, amino acids and a number of chemicals are changed. Some of these changes can be used as an objective index in recording smog.

It has been shown that the oxidant rises as soon as the sun comes up, and at sundown and during the night the oxidant is very low or absent. Calculated as active oxygen, concentrations of 1.0 part per million have been reached during the peak of a smog attack. This oxidant consists of ozone, organic peroxides, and nitrogen peroxides. Separate measurements for ozone have shown values as high as 0.5 p.p.m., a concentration which can be detected by odor, and which is able to cause nose and throat irritation in sensitive individuals.

It is usually assumed that only fresh country air contains ozone, and its concentration is usually in the order of 0.03 p.p.m. In inhabited areas, the ozone is reported to be absent. It was, therefore, surprising to find in Los Angeles a concentration of ozone tenfold greater than that found even in the country. The explanation was found in the oxidation of organic material by sunlight and oxygen in the presence of small quantities of nitrogen oxides. In this oxidation, peroxides are formed which add to the total oxidizing effect of the smog air.

It has been shown that these peroxidic oxidation products give plant damage identical with that observed in this area. This damage is easily distinguishable from that caused by sulfur dioxide or fluorides. The fumigation of plants with ozone and gasoline as the source of organic material, or the photochemical oxidation with nitrogen oxides and gasoline lead to the same effect. These experiments have been conducted at concentrations closely resembling those measured during smog periods.

In these fumigations eye irritation is experienced. In addition, aerosols are formed in the oxidation process, especially when unsaturated ring compounds are present. Fumigations carried out with fractions of gasoline and with pure hydrocarbons have shown that the irritating effects are not due to a single constituent of the gasoline, but that the most severe damage occurs in the fractions containing from four to seven carbon atoms per molecule.

Analytical studies of the composition of smog air have shown the presence of a large variety of hydrocarbons. In mass spectrographic studies carried out by Dr. Shepherd of the National Bureau of Standards a similarity was established between the composition of smog and that of a mixture of hydrocarbons subjected to the action of ozone, nitrogen oxides and ultra-violet light.

Checking the sources of emission of hydrocarbons revealed considerable losses in the processing, distribution and consumption of gasoline. The Los Angeles County Air Pollution Control District established in 1950 that these losses, amounting to 1,500-2,000 tons daily, are about equally distributed between industry and the automobile. Since that time, recovery measures have been instituted at the refineries, and some 200 tons are no longer being wasted through emission to the air. In progress are corrective measures on tanks, separating tanks, emergency releases, etc., as well as on fuel losses in the distributing process. It is now recognized that many of the corrective measures return a profit and will materially reduce fire hazard. In view of these advantages, coupled with the good neighbor policy on the part of the refineries, we may look forward to a speedy solution of this part of the problem.

Less encouraging is the progress made in the curtailment of the losses of hydrocarbons and their oxidation products from the automobile. On the contrary, the gain made by the petroleum industry has

been offset by the increase in the number of automobiles, and their contribution has already surpassed that from the refineries. This trend will continue unless control measures are taken. The visible smoke from the automobile exhaust plays only a minor role. The main offender is the 7 to 10 percent of unburned fuel which leaves the exhaust. Inventors are engaged in devising mufflers which will burn these gases catalytically, and important progress is being made in this direction. However, such devices are not yet ready, and when available, their installation will be a material taxation on the two million automobile drivers in this area. Parallel with the development of these devices should go studies on the more economic use of fuel through improved engine design and carburation, and studies on the production of fuel which is not a potential irritant when released to the air.

The individual can cooperate by keeping his automobile in good mechanical condition, and considering the advantage of more mileage per gallon when buying a new car. Finally, it is essential that the city planners curb the daily stampede of automobiles and relieve the congestion by working out an efficient mass transportation system. It should be realized that the solution to the smog problem is a technical one. Successful solution depends on the rapid installation of efficient control measures by industry, plus the complete cooperation of a well informed public to reduce as far as possible every known source of air pollution.

Measurement of Smog

Areas which have not yet been affected by air pollution can profit from the experience accumulated in other cities. One of these lessons is that we should be continuously watchful for the impurities in the air. This means that the analytical chemist should make a continuous check on the composition of the air for elements which contribute to air pollution problems.

When the air pollution problem has not reached a stage in which the people are aroused, this analytical work has to be done on a modest scale, and it is therefore essential that the utmost economy be considered in selecting the type and the number of analytical methods to be used. The typical effects in Los Angeles correlate very well with the analysis of the oxidant, either by a potassium iodide method or by that using phenolphthalin. Other areas will be affected by dusts or sulfur dioxide. These are the most common types of air pollution, and it is therefore suggested that if any testing program is set up which will be useful in the future, that the measurement of oxidant, sulfur dioxide and dust be included.

We should not forget that lack of these data taken at an early time makes it very difficult to gauge the effectiveness of any control program. Such data also clearly indicate a trend in air pollution which may persuade the authorities to take a more vigorous action in combatting air pollution.

III. AIR POLLUTION AND LUNG CANCER

PAUL KOTIN, M.D., Assistant Professor of Pathology, School of Medicine, University of Southern California

The increasing frequency of lung cancer presents several facets which indicate that the atmospheric environment may be etiologically associated with this observed increase. A study of the atmosphere and the sources of man-created pollutants seems especially indicated with the realization that epidemiologically, a disproportionate rise in incidence has been noted in urban population groups by investigators here and abroad, and it is in the urban areas that air pollution is greatest.

Carcinogenic Hydrocarbons

The demonstration of carcinogenic hydrocarbons in the atmosphere and exhaust products, and the production of skin cancers in C57 black mice by the painting of atmospheric extracts is self-explanatory. Certain elaborations are necessary, however, in attempting to explain (1) the high tumor yield in the face of relatively low concentrations of 3,4-benzpyrene in the atmosphere, (2) the low concentration of 3,4-benzpyrene in the air in view of the known high quantitative emissions from vehicular sources and other origins, and (3) a mode of biological activity for the carcinogenic air pollutants in the pathogenesis of human lung cancer.

Other Hydrocarbon Substances

The demonstration of approximately only 900 micromilligrams of 3,4-benzpyrene per million cubic feet of air in two successive samples suggests as a reasonable possibility that carcinogenic materials other than 3,4-benzpyrene may be present in the atmosphere. The polycyclic hydrocarbons demonstrated along with benzpyrene in the air are traditionally noncarcinogenic, or of such low carcinogenicity as to preclude any significant biological effect on their part insofar as is known. We have remaining either unknown compounds such as those already demonstrated and designated compound "X" and "Y" or perhaps other unknown aromatic hydrocarbon substances whose carcinogenicity must be assayed. While this will be done, their presence is in trace quantities and so high an order of tumor-yielding potency must be ascribed to

them as to make this conclusion unlikely. A second source of carcinogenic activity may be sought for in the oxidation products of atmospheric hydrocarbons both aromatic and aliphatic. Haagensmit has clearly shown that a chief characteristic of urban polluted air is its marked oxidizing capacity. The phenomenon is capable of acceleration in sunlight and heat. It is of interest to note that biological responses, including eye inflammation, upper respiratory tract irritation and specific leafy plant damage, are attributable to these organic oxidation products. It is this latter botanical property that we use as an indicator of the presence of hydrocarbon air pollution.

Epoxide Stage

In the stages of oxidation of organic peroxides to aldehydes and ketones, the epoxide stage is an intermediate one. Inferentially, a diepoxide stage may be assumed which would provide materials of experimentally demonstrated carcinogenicity in the atmosphere. The presence of epoxides and the chemically assumable diepoxides, in addition to other hydrocarbon oxidation products, are thus in need of definitive investigation, which program is now in the process of initiation. It is of extreme significance perhaps to note that in painting experiments on C57 black mice, using oxidation products exclusively, three papillomas have thus far been produced.

Effect on Hydrocarbons in the Air

The fate of polycyclic hydrocarbons, in general, and 3,4-benzpyrene specifically following emission into the air, is in need of definition in view of the large quantities of benzpyrene emitted into the atmosphere from gasoline engine exhausts, diesel engine exhausts and refuse incineration sources.

The effects of urban air pollution (smog) and certain of its individual pollutant constitutents on the survival of 3,4-benzpyrene has been investigated in a preliminary manner. Benzpyrene may be recovered from 96 to 100 percent following exposure to oxygen, ozone or gasoline separately in chambers. Exposure to nitrogen dioxide resulted in approximately a 40 percent recovery of benzpyrene. Ozone plus nitrogen dioxide, and ozone plus nitrogen dioxide plus gasoline each resulted in destruction of approximately 40 percent of the benzpyrene. Finally, ozone plus gasoline yielded approximately an 80 percent recovery of benzpyrene. Techniques and analytical methods used in the above initial determination, and additional detailed quantitative studies will be recorded in a future publication concerned with efforts to determine the fate of carcinogenic hydrocarbons adsorbed on soot.

Experimental Work With Mice on Lung Cancer

A review of the literature cannot but impress one that the experimental production of lung tumors in C57 black mice with respired hydrocarbon has been generally unsuccessful. Experimental painting and clinical hydrocarbon environmental cancers thus far reported have been primarily limited to the skin. Evidence exists that this disparity may be due to the fact that carcinogenic hydrocarbons are biologically ineffective while adsorbed on soot particles within a given size range, becoming effective only upon elution or displacement from the soot particle. The sebaceous secretions on the skin may provide the lipid solvent to elute the carcinogenic hydrocarbons from soot, while in the lungs no such eluting agent is present.

The foregoing does not preclude, however, an association between air pollution and lung cancer when an external eluting agent is present in the atmosphere in combination with soot. Primarily under urban conditions, but also in rural areas, gasoline vapors and more significantly their gaseous oxidation products in aerosol form, are present in combination with soots allowing for the simultaneous breathing of the components. A solvent has thus become available to extract aromatic polycyclic hydrocarbons from soot so as to allow their activity on the respiratory mucosa. This liberation of, for example, 3,4-benzpyrene—one of the polycyclic hydrocarbons—from the soot to which it had been previously harmlessly adsorbed, permits its local action with resultant theoretically possible cancer initiation.

Particle Size of Pollutants

An additional factor which may also be of considerable significance is that of the particle size of pollutants in the air, since settling on the respiratory mucosa is obviously necessary for carcinogenesis. Aerosol particles, lying in the range between those large particles incapable of passage distal to the upper respiratory tract and those small particles which remain suspended in the tidal air, are present in urban polluted atmosphere.

Factors Related to Increase in Lung Cancer

Much of the interest in the present study stems from some of the geographic and epidemiologic aspects of the increase in lung cancer. It appears that there are (1) differences in the starting periods from which the increase may be assumed to have begun, (2) variations in the incidence in the two sexes from country to country, and (3) different rates of acceleration of incidence in various localities. These characteristics are capable of correlation with the incrimination of the atmosphere as a pathogenetic factor in

the increased incidence of lung cancer on the basis of studies of Hueper, Steiner, et al., Stocks and Kennaway. Not only has urbanization and industrialization been nonuniform in its development, but the rural distribution of urban-created and to a lesser degree rural-created air pollutants require studies from the point of view of frequency of contamination and dilution of the contaminants.

Conclusions

In conclusion, it is again suggested as a reasonable possibility that the numerous unanswered questions relative to the causes of the increasing frequency of lung cancer are more capable of being answered by the incrimination of the atmosphere rather than any other agent including tobacco. The way for additional studies has been indicated by our studies.

It is of extreme significance to recognize that, first, air pollution as it exists in Los Angeles, the site of our study, exists in all probability in all large urban communities as determined by the use of phytopathologic indicators as well as chemical analysis. London, Zurich, Copenhagen, San Francisco, New York, among other cities have all shown pathognomonic "smog" damage to plants. Quantitative differences do exist. Second, 3,4-benzpyrene is probably but an indicator or thermometer for the presence of carcinogenic substances in the atmosphere. Third, gasoline and more signficantly its oxidation products, although in themselves noncarcinogenic, give strong suspicion of being involved in the pathogenesis of human lung cancer. Fourth, alipathic hydrocarbons and their oxidation products need study to assay any inherent carcinogenic properties possessed by them. Fifth, the sources of known carcinogenic hydrocarbons have been shown to include not only vehicular exhausts, but also home and commercial refuse incineration and railroad diesel effluents. Finally, it is suggested that in those areas showing a lagging increase in lung carcinoma frequency, correlation with lagging industrialization, use of gasoline motive power and urbanization seem demonstrable. This is offered as an alternate explanation of the findings of Dungal.

Public Health Positions

Los Angeles City

Assistant Public Health Nurse Director. Salary range, $464 to $575. Applications must be filed by March 2, 1954. Applicants must have at least four years of experience within the last 10 years as director of nursing in a public health nursing service employing at least 10 nurses or as an assistant director of nursing in a public health nursing service employing more than 50 nurses. A master's degree is desirable. Valid registered nurse and public health nurse certificates issued by the State of California are required prior to appointment. Further information may be obtained by writing Civil Service, Room 5, City Hall, Los Angeles.

Napa County

Health Officer. Salary is open. California license and M.P.H. are required. Some experience is desirable. Napa County has a population of approximately 55,000 and is predominantly rural. Write R. S. Westphal, M.D., Acting Health Officer for Napa County, P. O. Box 749, Napa.

Staff Sanitarians. Two vacancies exist. Salary is open. Automobile required; mileage is eight cents per mile. Write R. S. Westphal, M.D., Napa.

San Bernardino City

Staff Sanitarian. Salary range, $328-$393. Open to nonresidents, but appointee must establish residence in the city. State certificate as registered sanitarian is required. For further information write James W. Moreland, M.D., City Health Officer, Room 110, City Hall, 426 Third Street, San Bernardino.

San Diego County

Physician. Salary, $786. Position is for health department's tuberculosis clinic. Applicants must possess California license and have a minimum of two years' experience in diagnosis and/or treatment of tuberculosis patients. Write San Diego County Civil Service, 402 Civic Center, San Diego.

State of California

Medical Social Worker. Salary $325-$395. To provide case work services to patients receiving medical care or occupational and physical therapy. It is anticipated that an appointment will be made at the School for Cerebral Palsied Children, Altadena, Los Angeles County.

Medical Social Work Consultant. Salary $395-$481. To work in either the State Department of Public Health or the State Department of Social Welfare. Present vacancy is with the Department of Public Health with headquarters in San Francisco.

Final filing date for above positions is February 23d. Examination date is March 16th. Applications are available from the State Personnel Board, Sacramento, San Francisco, or Los Angeles or at any local office of the California Department of Employment.

U. C. L. A. to Offer Summer Course on Emergency Problems

The Department of Public Health on the Los Angeles campus of the University of California will offer a new course during the first six-week summer session, June 21st to July 30th, entitled "Medical and Health Problems in Emergencies." The course, Public Health S301, will be given by John Beeston, M.D., Associate Professor of Public Health. As wartime Chief Civil Defense Medical Officer for the northwest area of London, Dr. Beeston rendered distinguished service during the London blitz, for which he was bestowed honors by the King of England. He has been teaching at U. C. L. A. since 1947.

The new course is described as "principles and practices involved in planning and operating emergency medical and public health services in disaster situations. Study of problems in first aid, rescue, transportation of the injured and providing emergency housing, sanitation, feeding and supportive services to maintain morale."

The class will meet Monday through Friday at 11 a.m. Further information may be obtained from the Office of Summer Sessions, University of California, Los Angeles 24.

State Board of Public Health Enlarged to Nine Members

Two additional members have been appointed to the California State Board of Public Health by Governor Goodwin J. Knight in accordance with a legislative amendment enacted during the 1953 session increasing the board from seven to nine members. Governor Knight has appointed Mrs. Mildred Bevil, of Sacramento, President of the California Congress of Parents and Teachers, to serve a three-year term, January 15, 1954, to January 15, 1957; and Francis A. Walsh, Vice President of a Los Angeles pharmaceutical firm, to serve a one-year term from January 15, 1954, to January 15, 1955.

Mrs. Bevil in her many years of service with the P.T.A. has shown particular interests in the health aspects of family education, in the problems of rural health and in mental health as it relates to the family, the school and the community. Mr. Walsh, who obtained a master's degree in pharmacy at the University of Southern California, has served as vice president of the Board of Governors of the American College of pharmacists and for six years was a member of the State Board of Pharmacy.

Governor Knight has also reappointed two members of the present board for four-year terms ending January 15, 1958. They are Charles E. Smith, M.D., president of the board, and James F. Rinehart, M.D., San Francisco, the board's vice president. Dr. Smith is Dean of the School of Public Health, University of California, Berkeley, and Dr. Rinehart is Professor of Pathology, University of California Medical School, San Francisco. Dr. Smith has served on the board since 1940, and Dr. Rinehart since 1942.

Other members of the present board and the year their terms expire ars as follows: Samuel J. McClendon, M.D., San Diego, 1955; Elmer Belt, M.D., Los Angeles, 1956; Harry E. Henderson, M.D., Santa Barbara, 1956; Errol R. King, D.O., Riverside, 1957; Sanford M. Moose, D.D.S., San Francisco, 1957.

The current change in the composition of the board is the first since 1938, when a dentist was added. Since that time the state law has required six members of the board to be physicians and one to be a dentist. In addition, the Director of Public Health, a physician with specialized training in public health, is a statutory member of the board and serves as its executive officer. Wilton L. Halverson, M.D., has served as director since 1943.

Prior to 1943 the State Board of Public Health functioned as an administrative body, but legislative changes in that year vested the administrative responsibilities in the State Director of Public Health and effected extensive reorganization of the State Department of Public Health. The State Board of Public Health now serves in an advisory capacity on administrative matters, but serves as the legislative and judicial arm of the department. It is empowered to "adopt, promulgate, repeal and amend rules and regulations consistent with law for the protection of public health." It also issues, suspends and revokes licenses and permits issued by the department.

Governor's Conference on Youth

Governor Goodwin J. Knight has called a Conference on California's Chilren and Youth "to assess the achievements of past years and set new goals for the future." The "citizen's study" conference, which will draw participation from the state and local health departments, will be held February 25th and 26th in Sacramento.

Invitations to participate have been extended to many agencies and individuals concerned with juvenile delinquency, and the problems facing the courts, probation officers, law enforcement agencies and state and local agencies serving children and youth.

Personal Notes

Mrs. Ann W. Haynes, Chief of the Bureau of Health Education, State Department of Public Health, began a five-months leave of absence January 15th to accept a temporary appointment to the faculty of the School of Public Health, University of California, Berkeley. She is replacing Dr. Dorothy B. Nyswander, Professor of Health Education, now on sabbatical leave. Mrs. Haynes will return to the department June 15th. In her absence, Miss Lucretia Saunders, health education consultant, is the acting chief of the bureau.

Frank Hess, M.D., has been appointed as a medical officer with the State Department of Public Health and assigned to the Bureau of Tuberculosis. He will assist Chesley Bush, M.D., recently appointed acting chief of the bureau during the absence of Edward Kupka, M.D., now on a two-year leave serving as public health adviser to the government of Viet Nam. Dr. Hess recently completed three years with the Air Corps. Just prior to his appointment to the department he was employed temporarily by the San Mateo County Health Department to replace a staff member on sick leave.

There are more juvenile delinquents with impaired hearing than with any other physical defect.—*National Auricular Foundation.*

California Will Participate in Polio Vaccine Trials

Administrative details are being developed by the State Department of Public Health in cooperation with local public health departments for California's participation in field trials of poliomyelitis vaccine this spring. A decision to take part in the field trials was made by the department upon recommendation of its advisory committee of medical, public health and technical experts at a meeting in Los Angeles February 5th. The ad hoc committee, appointed last year to advise on the use of gamma globulin for contacts of polio cases, has continued to serve the department in considering the proposed field trials of polio vaccine.

Administratively, the following arrangements must be made prior to beginning the tests:

1. Selection, with local authorities, of geographical areas agreed upon in consultation with the National Foundation for Infantile Paralysis. Areas will be considered on the basis of a number of factors, including childhood population (the vaccine will be given to children in the first three elementary grades), concentration of population within an area, and the incidence of poliomyelitis in recent years.

2. Assistance to local public health agencies in working out trial details with medical and other professional societies, parents' boards of education and other interests agencies.

3. Develop procedures for carrying out the administrative details.

An important factor in the proposed field trials is that production of sufficient quantities of the vaccine has been delayed. California's participation is dependent upon the availability of polio vaccine in time so that the injections can be completed by early June. The vaccine will be given in a series of three injections over a five-week period.

Driving a car is twice as dangerous in rural areas as in the city areas, according to the National Safety Council. Higher speeds on rural highways account for much of the hazards.

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Rehabilitation Center to Offer Postgraduate Workshop

The Morrison Center for Rehabilitation, 1680 Mission Street, San Francisco, will hold a graduate workshop March 8th to 26th for qualified physical and occupational therapists, but open to the medical profession and registered nurses.

The course is designed to provide an opportunity to:

1. Study functional bracing for the upper extremity.
2. Learn how to make and use feeders and other adaptive appliances.
3. Round out knowledge concerning the rehabilitation of the paraplegic; positioning on Foster and Stryker frames, bracing, bowel and bladder care, training in the daily habits of living.

The course of both didactic and practical instruction will cover 100 hours. One-third will be spent in classroom and seminar; two-thirds will be spent in workshops and work with patients.

A fee of seventy-five dollars ($75) will be charged.

According to Hazel E. Furscott, director of the center, the teaching staff will be headed by Dr. E. R. Schottstaedt, Consultant in Orthopedics to the Morrison Center for Rehabilitation and Assistant Clinical Professor of Orthopedic Surgery at the University of California. Specialists in physical medicine, general medicine, urology, neurology, and psychiatry will participate. Mr. George Robinson of Robin-Aids, Vallejo, will teach the section on functional arm bracing.

Dr. Leslie Corsa Appointed New MCH Director

Leslie Corsa, Jr., M.D., has been appointed chief of the department's Bureau of Maternal and Child Health. Dr. Corsa comes to California from Massachusetts, where he was the administrator of Child Health Service for the Massachusetts General Hospital, Boston. He received his medical degree from the Harvard Medical School in 1946, returning to the Harvard School of Public Health in 1951-52 for his master's degree in public health, with his major in maternal and child health.

Former chief of the bureau, Dr. Anita Faverman, resigned in August 1952, but returned to the department for an interim period while a successor could be selected.

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